DOCUMENT RESUME

ED 181 302 CE 023 882

AUTHOR Barclay, Suzanne: And Others
TITLE Employment and Schooling as Complements and Substitutes: Results for 16-19 Year Old Youths from Low-Income Households.
INSTITUTION Abt Associates, Inc. Cambridge, Mass.
PUB DATE 29 Aug 79
NOTE 40p.: Paper presented at the Annual Meeting of the American Sociological Association (Boston, MA, August 29, 1979).

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Demography: *Disadvantaged Youth: Evaluation Methods: Family Background: Interviews: Low Income Groups: Parent Attitudes: Program Evaluation: *School Attitudes: *Surveys: *Work Attitudes: Work Experience: Youth Employment: Youth Programs
IDENTIFIERS *School to Work Transition: *Youth Incentive Entitlement Pilot Projects

ABSTRACT

Before enrollment of youth began in the Youth Incentive Entitlement Pilot Projects (YIEPP) program, a survey was conducted of program eligible youth in four of the largest Entitlement areas and in four matched control sites in order to provide baseline data for an impact analysis of the YIEPP program. After probability sampling, over 120,000 households were interviewed in the eight sites, and family income eligibility as well as the presence of program eligible youth was ascertained in each case. Enumerators then returned to each of the potentially eligible households and secured lengthy interviews with the eligible youths and their parents. As a result, a data set containing information on 7,553 youths was assembled. This sample size was then narrowed to 6,415 youths which included only 16- to 19-year-olds who had not graduated from high school and who came from low-income families. This baseline survey of program-eligible youth and their parents was completed spring 1978. The survey captured information on demographic and family background characteristics which included income, income sources, and pre-program behavior with regard to schooling and work experience. It was in no way identified with the YIEPP program. Three annual waves of re-interviews are planned for this sample, and the data will be used to increase basic knowledge in the area of youth transition from school to work and adulthood and to develop the models and methods necessary for the proper impact evaluation of the program. (BM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED181302

EMPLOYMENT AND SCHOOLING AS COMPLEMENTS AND SUBSTITUTES: RESULTS FOR 16-19 YEAR OLD YOUTHS FROM LOW-INCOME HOUSEHOLDS

S. Barclay
C. Bottom
G. Farkas
E. W. Stromsdorfer

Abt Associates, Inc.
55 Wheeler Street
Cambridge, Mass. 02138

R. J. Olsen
Yale University
New Haven, CT. 06520

Presented at the Annual Meeting of the American Sociological Association, August 29, 1979, Boston, Mass.
We are grateful for Beverly Duncan's comments on an earlier version.

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Suzanne Barclay

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CE023882

I. INTRODUCTION

> "Over the last sixty years fluctuations about the long-term trend toward rising educational attainment for males have coincided with changes in the job market. Since the end of World War II fluctuations about the trend toward higher rates of school attendance for teenage boys have been coincident with changes in the job market for youth. When jobs are scarce, young men seem to defer leaving school; when jobs are plentiful, the dropout rate accelerated."
>
> "There is, then a curious contradiction in two points of public concern. Joblessness among youth is perceived as 'too high.' At the same time, the dropout rate among teenage boys is perceived as 'too high.' These results suggest, however, that a successful policy to reduce unemployment among dropouts might well have the side effect of encouraging boys to drop out of school before high-school graduation."
>
> Duncan (1965: 133-134)

Thus, fourteen years ago, did Beverly Duncan point out that school and work decisions are jointly determined, a fact of potentially great significance for studies of behavior during early life cycle stages as well as for public policies aimed at decreasing school dropout and youth unemployment. And yet, until recently, most studies of youth behavior have concentrated on either the school enrollment decision and its concomitants or entry into the labor force and its concomitants, with little work aimed at symmetrically modeling these interrelated decisions. Similarly, public policy has typically focused on either "dropout prevention" (through programs such as those prescribed by Title VIII of the Elementary and Secondary Education Act) or "unemployment prevention" (through employment or employment and training programs such as the Neighborhood Youth Corps, the Youth Conservation Corps, the Job Corps, and the Summer Youth Employment Program for Economically Disadvantaged Youth). These programs, and the evaluations of them, have not adequately dealt with the possibility that because of a school/work tradeoff, program incentives to engage in either activity may function as disincentives to engage in the other.

Now, with the passage of the Youth Employment and Demonstration Projects Act (PL 95-93, August 5, 1977), we have an experiment, the Youth Incentive Entitlement Pilot Projects (YIEPP), which involves the explicit tieing together of youth employment and school enrollment. In 17 labor markets, eligible youth (economically disadvantaged 16-19 year olds who have not graduated from high school) are being offered a full-time job during the summer and a part-time job during the school year so long as they are enrolled in school and performing adequately. This is an entitlement program - sufficient funds have been provided to serve all eligibles who apply. Nevertheless, it remains to be seen whether or not publicly provided, minimum wage job guarantees for the youth target population will furnish meaningful work experience while at the same time encouraging those in school to stay, and those out of school to return. In addition, so little is reliably known concerning the decision-making of low-income youth with regard to schooling and labor force behavior that until a good deal more basic conceptualization, measurement and estimation is accomplished in this area we will continue to lack the intellectual foundation from which to properly identify and address the relevant policy issues.

This paper reports results obtained from an analysis of Wave I of the data collected for the evaluation of the YIEPP program. This baseline survey of a stratified random sample of program eligible youth and their families in four study and four matched control sites contains information on the preprogram behavior of 7,553 youths. These data result from probability sampling in each of the eight sites, and contain information on

program eligibles some of whom will and some of whom will not subsequently choose to become program participants. The survey was conducted prior to, or contemporaneous with, program start-up, and was in no way identified with the YIEPP program. Three subsequent waves of reinterviews will be conducted with these individuals and their parents, and these data, combined with school performance records (which will be obtained for each youth), will provide the basis for measuring rates and determinants of program participation, as well as short- and longer-run program impacts. However, in this paper we use the information on preprogram behavior to estimate models of the short-run dynamics of school enrollment and employment experience prior to program start-up. Our findings are of general interest for the light they shed on the transition from school to work in this population, as well as being of specific interest for the identification of variables and the specification of models to be used in the program effect analyses to come.

From a broader perspective, the most interesting aspect of our findings lies in the light they shed on the situation and behavior of an important, but infrequently surveyed group--older teenagers from poverty families, often black, often living either in inner cities or rural areas, and often either out-of-school or making less than regular progress in school. The large size of our sample relative to its narrow age range permits us to examine in unprecedented detail the rapid changes which accompany aging during late adolescence in this population, and the across-site variation built into the research design provides an important opportunity to study the effects of local labor markets and school systems upon this behavior. By comparison, the National Longitudinal Study of High School Seniors of the Class of 1972, which contains approximately 23,000 observations, reports on what is almost an entirely different population--one that has attained twelfth

grade, contains no dropouts, is predominantly white, with a high propensity to graduate from high school and go on to college. Results obtained with our data, when contrasted with findings from the National Longitudinal Study and similar data sets (see, for example, Meyer and Wise, 1979), promise to provide fascinating snapshots of the American Mainstream and the American Underclass in their formative years.

II. CONCEPTUAL ISSUES AND PREVIOUS RESEARCH

Our point of departure is Beverly Duncan's finding that in the aggregate, and at any particular point in time, school and work are gross substitutes, that is, they are inversely related. Greater participation in one activity is associated with lesser participation in the other. This is not surprising, since there are only so many hours in the day, but it is not necessary either. For within certain ranges, and under the right incentives, it should be possible to increase participation in both school and work, at the expense of the residual category (often labeled "leisure"). The extent of the school/work tradeoff is thus an empirical question, one which we shall address with individual-level data.

However, even if school and work tend to be substitutes at one point in time, this does not prevent their being complements across time. Indeed, the belief that they are is the cornerstone of human capital models of educational investment and lifetime labor supply. According to this view, individuals forego potential earnings and leisure while in school in order to command a higher wage rate and better working conditions in later life. These increased returns from working then lead to increased participation in this activity.

This is a long-run and somewhat schematic model of the individual's over-time behavior; a number of other considerations emerge when the focus shifts to short-run dynamics. These include the possibility that money earned from employment at one point in time will make it possible to attend school at a later point in time; that even small increments in schooling at one point in time will increase employability, wage rates, and therefore employment at a later point in time; and that in the short-run, both school

enrollment and job-holding exhibit persistence-in-state. The argument for such persistence in employment status has recently been made as follows:

> "Because of high separation costs and costs of finding new employment, those who are employed tend to remain employed. Persistence of employment might also be rationalized on human capital grounds. Those who are employed longer tend to accumulate more human capital, which raises the return to work in the future relative to leisure. Those out of the labor force may also develop household-specific capital or commitments (i.e., children) which reduce the return to working relative to remaining outside the labor force. There is also some reason to believe that the taste for work may be affected by work experience. Such habit formation effects have been well documented in demand analysis."
>
> Clark and Summers (1979: 4)

Part of this argument depends upon the importance of on-the-job training and the creation of firm-specific human capital; part depends upon a cumulative mechanism of habit formation. And both of these arguments could equally well apply to persistence in school enrollment. Thus, school credits may not be easily transferable, and may be of relatively low value until a sufficient quantity have been accumulated for graduation. Also, students acquire an investment in "knowing the system" and in learning how to study. In addition, success in school as measured by performance on examinations and progress through successive grades may have a self-reinforcing, habit formation effect. In fact, it is likely to lead to upward revision in the amount of schooling desired.

The interplay of these factors, and the resulting short-run dynamics of secondary school enrollment and dropout, are little understood. Perhaps the main reason for this lack of knowledge is that longitudinal data for large samples of pre-high school graduation youth have not been readily available. A recent study by Hill (1979) does employ the National Longitudinal Survey of Young Men to examine the causes of school dropout, but Hill's

principal concern is with estimation of a recursive model in which family background and an index of school quality affect IQ, knowledge of the world of work, curriculum choice (academic vs. vocational), and finally, school dropout. Hill's results demonstrate that age-schooling retardation (enrollment in grade 9 at age 16 or in grade 10 or less at age 17) is positively associated with school dropout in succeeding years, but he does not fit a model in which year-to-year persistence in school is estimated alongside year-to-year persistence in work, with cross-effects (the effect of school at time t on work at time t+1; the effect of work at time t on school at time t+1) simultaneously accounted for.

We do fit such a model. In addition, we distinguish summer employment, when school is not usually a competing activity, from school-year employment, when it is; and we permit summer employment, school-year employment, and school enrollment to be jointly determined. As a result, we are able to measure the effects of exogenous variables (such as race, sex, and family background characteristics) on each of these dependent variables, and we are also able to measure the relationships among the school enrollment and work experience variables, net of the effects of the exogenous variables. The relative strengths of these effects provide a summary of the dynamics of change during this early stage of the life cycle, as well as an indication of the likely mechanism of effect associated with labor market interventions such as the Entitlement demonstrations.

III. MODELS AND DATA

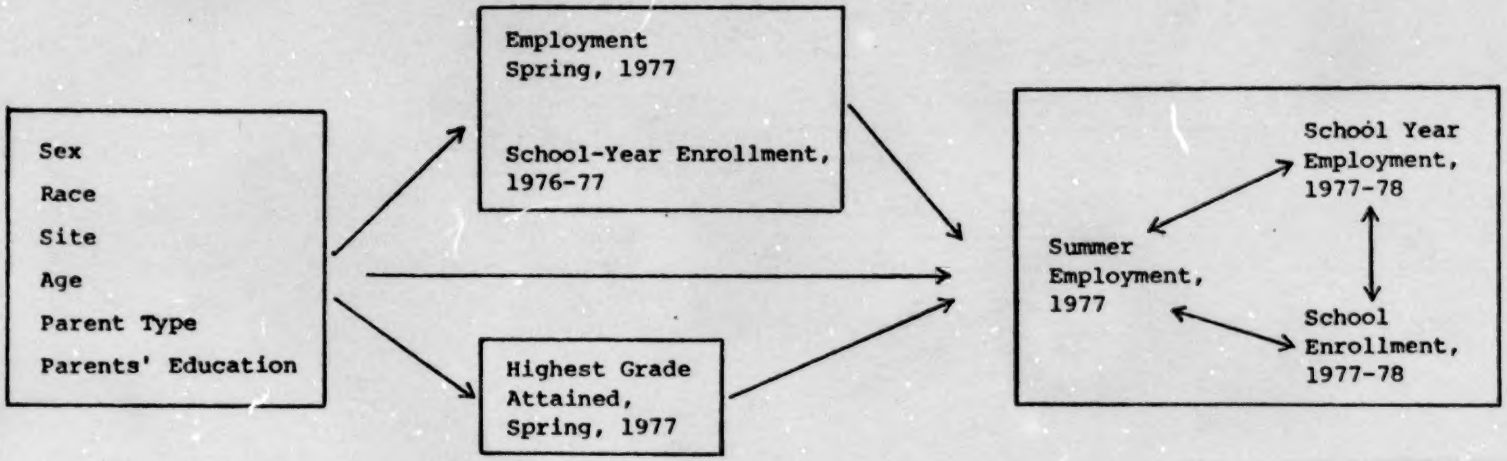
Figure 1 provides a schematic view of our modeling framework. For youths who were 16-19 years of age during Spring, 1978, who had not graduated from high school at that time, and whose households were below the poverty line, we take employment during the summer of 1977, during the 1977-78 school year, and school enrollment during the 1977-78 school year to be jointly determined, as well as dependent upon (a) employment, school enrollment and grade attainment during the previous year and (b) exogenous variables such as sex, race, location, age, household structure (parent type - whether living with natural mother, father, neither, or both) and parents education. By estimating these relations in a reduced form (with only the exogenous variables as predictors) as well as in a dynamic form with the 1976-77 variables as additional predictors, we shall be able to sort out some of the distinctive forces at work.

The Econometric Specification

If we are to appropriately estimate the relationships suggested by Figure 1, a number of technical difficulties must be confronted and overcome. Possibly the greatest of these is that we are dealing with three jointly determined dichotomous variables, and these are in turn determined by variables some of which are continuous. Fortunately, recent work by Nerlove and Press (1973, 1976) provide methods well suited to this situation. These models can be viewed as an extension of the log-linear model for contingency tables (Bishop, Fienberg, and Holland, 1975; Goodman, 1972) in which the "main effects" in the log-linear model for the cross-tabulation of the endogenous variables are taken to be a function of exogenous variables, some of which may be continuous. Estimation is by maximum likelihood, and provides parameter estimates for the effect of each explanatory variable

FIGURE 1.

A DYNAMIC MODEL OF EMPLOYMENT AND SCHOOL ENROLLMENT



upon each dependent variable (binary dependent variable in our case), as well as estimates of the bivariate interaction terms for the dependent variables. When all variables are discrete the resulting models are a special case of the general log-linear model, and when only one dependent variable is permitted the resulting model is identical to the univariate logistic.

More formally, if A, B, and C are jointly dependent binary variables with states denoted by $i_1 = 0,1, i_2 = 0,1$, and $i_3 = 0,1$, and k denotes a particular cell of the AxBxC cross-tabulation (k = 0,0,0; 1,0,0; 1,1,0; etc.), then the model defines p_k, the individual's propensity to assume state k, to be

$$p_k = \frac{e^{\theta_k}}{\sum_{\text{All } k} e^{\theta_k}}$$

where $\theta = \alpha^A_{i_1} + \alpha^B_{i_2} + \alpha^C_{i_3} + \alpha^{AB}_{i_1 i_2} + \alpha^{AC}_{i_1 i_3} + \alpha^{BC}_{i_2 i_3}$ and the α's are log-linear model parameters (with the usual restrictions). Then, α^A, α^B, and α^C are written as linear functions of the explanatory variables (for example, for the i^{th} individual, $\alpha^A_{i_1 i} = x'_{ij}\alpha^{A*}_{i_1 j}$, where x_{ij} is the vector of the i^{th} individual's values for the explanatory variables, and α^{A*} is the vector of coefficients to be estimated) and coefficients are reported for the determinants of A,B, and C. (That is, α^{A*}, α^{B*} and α^{C*} are estimated. With additive restrictions, each is unique.) In addition, the values of α^{AB}, α^{AC} and α^{BC}, which are assumed to be independent of the explanatory variables, are reported. These binary interactions tie the equations for the dependent variable main effects together, so that their values must be combined with α^{A*}, α^{B*} and α^{C*} to produce fitted $\hat{p}_k$'s.

This model has a number of desirable properties. It appropriately models simultaneously determined dummy endogenous variables, is parsimonious, and is computationally tractable. Not only is the overall model logistic, but probability distributions for one of the dependent variables, conditional on the others, are also logistic. And if the bivariate interactions are zero the model produces identical results to those forthcoming from a collection of univariate logits, one for each dependent variable.

The Data

The Congress appropriated $115 million for job creation during the first year of the Youth Incentive Entitlement Pilot Projects (YIEPP) program, and after negotiation between the Department of Labor and local prime sponsors the program began in Spring, 1978, enrolling youth in seventeen local labor markets. In addition, the DOL contracted with the Manpower Development Research Corporation (MDRC) to conduct impact, cost, and implementation analyses, and to coordinate the implementation of the Entitlement demonstration under the supervision, management, and direction of the Office of Youth Programs of the DOL. MDRC has, in turn, subcontracted with Mathematica Policy Research of Princeton, New Jersey to conduct surveys of program eligible youth in four of the largest Entitlement areas as well as in four matched control sites, and with Abt Associates of Boston, Massachusetts to use these data to provide an impact analysis of the YIEPP program. A baseline survey of program-eligible youth and their parents in the eight sites was completed in Spring, 1978. This survey captured information on demographic and family background characteristics, including income and its sources, as well as on pre-program behavior with regard to schooling and work experience. It was in no way identified with the YIEPP program. Three annual waves of re-interviews are planned for this sample, and Abt's

mandate is to use these data to increase basic knowledge in the area of youth transition from school to work and adulthood, and, as a concomitant, to develop the models and methods necessary for the proper impact evaluation of the program, as well as to provide that evaluation.

This paper reports results obtained with the baseline survey. These data were collected as follows. After probability sampling, over 120,000 households were interviewed in the eight sites (the four pilot sites are Baltimore, Cincinnati, Denver, and certain Mississippi counties; the comparison sites are, respectively, Cleveland, Louisville, Phoenix, and other Mississippi counties), and family income elgibility as well as the presence of program eligible youth was ascertained in each case. Enumerators then returned to each of the potentially eligible households, and secured lengthy interviews with the eligible youth as well as with parents. As a result, a data set containing information on 7553 youths was assembled. It was thought desirable to permit 15 year olds into the sample in order to insure sufficient observations on 16 year olds in the years of program operation to come, but we have eliminated these from this report in the interest of focusing upon the behavior of the target population--16-19 year old youth who have not graduated from high school, and who come from low-income families. As a result, our basic sample size for this report is 6415.

Table 1 shows the age distribution of the full sample, recorded by month of birth and summarized by trimesters. (The sample size is 7553, with 6 missing date of birth observations.) To understand this method of counting, consider those individuals born between May 1, 1963 and August 30, 1963 (e.g., in trimester II, 1963). During the second trimester of 1978 they passed their 15th birthday (e.g., began the first trimester of their 15th year). Accordingly, their age at this time was 15, I. Other periods of birth are summarized similarly.

We see that the sample was collected so as to include 792 individuals who had not attained their 16th birthday by the end of August, 1978, and, in fact, 1138 individuals who had not reached this age by the end of June, 1978. (This is based on a tabulation by month of birth, not shown here.) Since the empirical work we report is directed toward discovering behavioral propensities and relationships for 16-19 year olds, and contains information on behavior only through the end of the spring school term, 1978, we have usually eliminated these 1138 from the sample for this report. (As a result, 7553 - 1138 = 6415.) This is an important point, because 15 year olds are to a very great extent enrolled in school full time and have had no work experience. Including them in the calculations for this report would seriously distort our target population estimates of the propensity to drop out of school or to have been employed.

In this table we are able to observe the truncation of older age groups due to the focus on individuals who have not graduated from high school. Thus, sample share begins to decline significantly for those aged 18, II, and by 19, II we have lost (through high school graduation) a bit over half of the relevant birth cohort. Of course, the fact that we have not lost more of this age group through high school graduation is one indication of the school progress difficulties exhibited by children from low-income families.

Table 2 shows the distribution of the sample by site and race (15 year olds have been eliminated). In view of the low-income, inner city or Southern rural nature of the sample, we are not surprised to find that it is heavily black in all sites except Denver and Phoenix, where it is heavily Hispanic. In tables not shown we find that the sample is roughly evenly divided between males and females, and sex exhibits little correlation with

Table 1 Age Distribution of the Full Sample

Trimester of Birth	Age in the Second Trimester, 1978	N	%
III, 63	14, III	26	0.3
II, 63	15, I	21	0.3
I, 63	15, II	66	0.9
III, 62	15, III	679	9.0
II, 62	16, I	686	9.1
I 62	16, II	663	8.8
III, 61	16, III	681	9.0
II, 61	17, I	684	9.1
I, 61	17, II	637	8.4
III, 60	17, III	673	8.9
II, 60	18, I	626	8.3
I, 60	18, II	529	7.0
III, 59	18, III	417	5.5
II, 59	19, I	380	5.0
I, 59	19, II	310	4.1
III, 58	19, III	273	3.6
II, 58	20, I	180	2.4
I, 58	20, II	16	0.2
Total		7547	100

Table 2 Racial Distribution of the Sample by Site, 16-19 Year olds*

Site	Race					
	White	Black	Hispanic	Other	Total	N
Denver	15.7	29.0	51.6	3.7	100	1006
Phoenix	30.8	19.6	43.8	5.8	100	413
Cincinnati	17.9	80.8	0.8	0.5	100	1193
Louisville	32.8	66.3	0.8	0.2	100	629
Baltimore	8.2	90.3	1.0	0.6	100	1421
Cleveland	12.8	83.6	2.4	1.1	100	537
Mississippi Pilot	13.6	86.3	0.1	0.0	100	757
Mississippi Control	13.4	86.4	0.2	0.0	100	434

Number of Missing Observations = 25

*Sample restricted to those who would have attained at least their 16th birthday by June, 1978.

either site, race, or age. As might be expected, fewer than half of the youth live with both natural parents, and the mean educational level of parents is between 8th and 9th grade. Few (approximately 2 percent) of the youth are married, or have ever been married, but fully 15 percent already have had at least one child.

IV. RESULTS

This section is organized as follows. We begin with the reduced-form calculations, estimates of the Figure 1 effects in which employment during Summer, 1977, employment during the 1977-78 school-year, and enrollment during the 1977-78 school-year are jointly determined and expressed as a function of the exogenous variables. Following this, we examine the results of dynamic specifications in which school enrollment, work experience, and grade attainment during the 1976-77 school year are also used as predictors.

IV. 1 The Reduced Form

Table 3 presents the results of estimating the reduced form. Here the predictor variables are sex (one dummy variable), race (two dummy variables), location (seven dummy variables), whether living with natural mother or father (three dummy variables), parents education (a continuous variable coded according to the number of years of school completed), and age (a continuous variable coded by single months). The Nerlove/Press specification provides for three equations, one for each of the dependent variables, with these equations tied together by net correlations among the dependent variables. Thus our results take the same format as the more familiar structural equation models, and the correlations among our dependent variables measure the extent to which these variables are substitutes and complements, net of the effects of exogenous variables.

Not surprisingly, since N=6,415, many of these results are highly significant. Many are also large in absolute terms. However, since the model is non-linear, direction of effect and statistical significance are more easily described than are absolute magnitudes of effect. Accordingly, we begin by summarizing the former, and then briefly provide some illustrative results for the latter.

TABLE 3

NET EFFECTS AND BIVARIATE INTERACTIONS IN MULTIVARIATE LOGIT ESTIMATION OF DETERMINANTS OF SUMMER EMPLOYMENT, SCHOOL YEAR EMPLOYMENT, AND SCHOOL ENROLLMENT. REDUCED FORM SPECIFICATION, AGE INCLUDED.

Explanatory Variable	School Enrollment Equation	School Year Employment Equation	Summer Employment Equation
Constant	1.736	-0.590	-0.539
	(19.43)*	(5.58)	(5.92)
Male	0.000	0.000	0.000
	(-)	(-)	(-)
Female	0.029	-0.195	-0.312
	(0.88)	(5.14)	(9.89)
White	-0.664	0.410	0.039
	(14.97)	(8.02)	(0.84)
Black	0.000	0.000	0.000
	(-)	(-)	(-)
Hispanic	-0.401	0.122	0.077
	(6.46)	(1.72)	(1.23)
Denver	-0.132	-0.073	0.440
	(2.21)	(1.08)	(7.30)
Phoenix	-0.237	0.000	0.353
	(3.23)	(0.00)	(4.77)
Cincinnati	-0.084	-0.409	0.267
	(1.78)	(7.59)	(5.33)
Louisville	-0.253	-0.298	-0.064
	(4.31)	(4.01)	(0.97)
Baltimore	0.000	0.000	0.000
	(-)	(-)	(-)
Cleveland	0.100	-0.567	0.538
	(1.65)	(7.44)	(9.03)
Mississippi Pilot	0.356	-0.609	-0.311
	(6.19)	(7.56)	(4.78)
Mississippi Control	0.241	-0.614	0.242
	(3.62)	(7.64)	(3.55)
Neither Natural Parent	-0.424	0.105	-0.068
	(7.90)	(1.62)	(1.20)
Natural Mother Only	-0.228	0.000	0.038
	(6.19)	(0.00)	(0.99)
Natural Father Only	-0.258	0.017	-0.005
	(2.68)	(0.15)	(0.05)
Both Natural Parents	0.000	0.000	0.000
	(-)	(-)	(-)
Parents Education	0.041	0.010	0.003
	(7.03)	(1.39)	(0.48)
Age	-0.033	0.010	0.008
	(25.52)	(6.71)	(6.51)

Bivariate Interactions:

School Enrollment, School Year Employment	-0.070	(t= 3.82)
School Enrollment, Summer Employment	0.137	(t= 7.52)
School Year Employment, Summer Employment	0.264	(t=15.69)

Log Likelihood = -9396.

* t-statistic in parentheses

Effects on School Enrollment

Reading down the first column of Table 3 we see that sex has no significant effect on school enrollment, but that race has quite significant effects, with blacks the most likely to be enrolled in school, hispanics next, and whites the least likely to be enrolled. These effects are large, and are consistent with the view that during the school year, school enrollment and job-holding are substitutes, with white youth enjoying greater employment opportunities than black youth.

Many of the site effects are also significant, but for the purpose of this analysis we regard these as controls for inter-site differences in schools and labor markets, and focus instead on the effects of the other variables. Those for household and family structure are significant, with youths living with only their natural father, or only their natural mother, less likely to be enrolled in school than youths living with both natural parents. As further corroboration of this effect, those youths living with neither natural parent show an even larger decline in their propensity to be enrolled. We also find that parents' education is positively associated with youths' school enrollment, a result which may be at least partly due to the effects of higher family income. Finally, the effects of age are large and negative. (The t-statistic of 25.5 is the largest in the table.) As these youths age, their school enrollment drops markedly. Of course, it must be remembered that youths who have graduated from high school are omitted from the sample, so the negative association between school enrollment and age is at least partly artifactual. That is, our sample is not fully representative of 18 and 19 year olds, since many of these have graduated from high school and so are excluded from the sample. However, this source of potential bias is eliminated by conditioning on highest

grade attained, since, for example, our sample is fully representative of 16-19 year olds who have attained no higher than 8th grade. And, when separate calculations are undertaken for groups defined by grade attainment, the negative effect of age on school enrollment persists.

Effects on School-Year Employment

The second column of Table 3 reports the effects of exogenous variables on the individual's propensity to be employed during the school year. Females are significantly less likely than males, and blacks and hispanics are significantly less likely than whites, to be employed during the school year. Household type and parents education exert no significant effects, and age exerts a significant positive effect. (As before, the age effect remains significant, with sign unchanged, when calculations are undertaken separately according to highest grade attained.)

Effects on Employment During the Summer

The third column of Table 3 shows that the disemployment effects for females as compared with males are more extreme during the summer than during the school year. However, racial employment differences essentially disappear during the summer. The disappearance of these racial differences can be attributed to the summer youth employment programs mounted by the Department of Labor. Enrollment in these programs appears to have been heavily skewed towards blacks. However, such is apparently not the case for females, so that male/female employment differences actually increase during the summer. Once again we find household type and parents education exerting no effect on employment, and once again age shows a significant positive effect.

Absolute Magnitudes of Effect on Each of the Dependent Variables

Since the multivariate logistic specification is non-linear, it is not possible to guess at absolute magnitudes of effect by simply examining the coefficient estimates. Accordingly, we have chosen a "reference population," and used the fitted model to generate this group's distribution across the eight categories defined by the dependent variables. By summing across these, taken two at a time, we arrive at predicted values for each of the dependent variables. By observing how these vary with changes in each of the independent variables, we have a straightforward indication of the absolute magnitude of effect due to each variable.

The results of these calculations are displayed in Table 4. Panel 4.1 shows the fitted values for the reference population, which is taken to be black males living in Baltimore, 17½ years of age, living with both natural parents, and with parents education = 9th grade. Looking within the eight cells of this panel we see, for example, that 34 percent of these youths were enrolled in school during the 1977-78 school, but did not hold a job either during this school year or during the preceding summer. (Observe that the percentages in these eight cells sum to 100.) Looking at the marginals on the right hand side of this panel (calculated by summing across pairs of variables on the left hand side of the panel) we see that 84.8 percent of these youths were enrolled in school, 39.6 percent were employed at some time during the school-year, and 42.6 percent were employed at some time during the summer.

The effects of the exogenous variables can be ascertained by looking down the successive panels of this table. (For the sake of simplicity we restrict attention to the marginals on the right hand side of these panels. Similar comparisons for the full eight-way distributions

TABLE 4

FITTED SCHOOL ENROLLMENT AND EMPLOYMENT PROBABILITIES, REDUCED-FORM SPECIFICATION

4.1 Reference Population: Male, Black, Baltimore, 17¼ Years of Age, Living With Both Natural Parents, Parents Education = 9th Grade.

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO		YES	
		NO	YES	NO	YES
NO		6.7	3.5	2.0	3.0
YES		34.0	13.3	17.7	19.9

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
84.8	39.6	42.6

4.2 Females

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO		YES	
		NO	YES	NO	YES
NO		9.0	3.1	1.4	1.5
YES		48.4	12.8	13.5	10.3

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
84.9	27.7	26.7

4.3 Whites

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO		YES	
		NO	YES	NO	YES
NO		11.3	13.3	3.7	12.4
YES		15.2	13.6	8.6	21.9

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
59.3	61.2	46.6

4.4 Hispanics

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO		YES	
		NO	YES	NO	YES
NO		10.6	7.0	3.7	7.0
YES		24.1	12.0	14.6	20.9

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
71.7	47.0	46.3

TABLE 4 (cont.)

4.5 Living with Neither Natural Parent

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	12.5	8.0	3.3	6.0
YES	YES	27.3	13.2	12.4	17.2

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
70.1	44.4	38.9

4.6 Living with Natural Mother Only

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	9.4	4.9	3.0	4.5
YES	YES	30.3	11.8	17.0	19.1

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
78.2	40.3	43.6

4.7 Living with Natural Father Only

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	10.1	5.4	3.0	4.6
YES	YES	30.5	12.4	15.7	18.3

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
76,9	40.7	41.7

4.8 Parents Completed 10th Grade

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	6.2	3.3	1.9	2.8
YES	YES	34.0	13.6	17.8	20.4

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
85.9	40.1	42.9

TABLE 4 (cont.)

4.9 Age = 16

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	2.9	1.0	0.6	0.7
YES	YES	48.3	13.3	18.5	14.6

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
94.8	29.6	34.5

4.10 Age = 17

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	5.2	2.4	1.4	1.8
YES	YES	39.0	13.6	18.3	18.3

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
89.2	36.1	39.9

4.11 Age = 18

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	8.5	4.9	2.8	4.7
YES	YES	28.8	12.7	16.6	21.0

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
79.1	43.3	45.1

4.12 Age = 19

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	12.1	8.9	4.9	10.5
YES	YES	18.7	10.4	13.2	21.1

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
63.5	50.9	49.7

would, of course, be possible.) Thus Panel 4.2 shows that for females who are otherwise members of the reference population, the fitted school enrollment rate is 84.9, essentially unchanged from that for males. This conforms to the result in Table 3, where the coefficient for the effect of this variable on school enrollment is small and statistically insignificant.

Continuing down the table we see that school enrollment rates for otherwise identical whites decline all the way to 59.3, an enormous drop of 25 percentage points. Other noteworthy results include a decline to a 70.1 percent enrollment rate for youths living with neither natural parent, and a decline from 94.8 percent to 63.5 percent as age increases from 16 to 19. Clearly, race and age exert the largest effects on school enrollment, and these are in the 25-30 percentage point range.

Similar comparisons can be made for effects on employment during the school year and employment during the summer. For employment during the school year, being female causes the rate to decline to 27.7 (a drop of approximately 12 percentage points) whereas being white causes the rate to increase to 61.2 (a gain of approximately 21 percentage points). As age increases from 16 to 19, school-year employment rates increase from 29.6 to 50.9, so that we once again find race and age exerting the most significant effects. As for summer employment, we find the largest effects on this variable to be attributable to sex and age. We see that the sex difference previously remarked on spans 16 percentage points for the reference population, a magnitude roughly comparable to the effects of age on this variable.

Bivariate Interactions Among the Dependent Variables: School and Work as Substitutes and Complements

The final results to be discussed from Table 3 concern the estimates of bivariate interaction among the dependent variables. These

interactions function as correlations for dichotomous variables, and provide one test of the extent to which school and work are substitutes or complements for otherwise identical youth. (See Bishop, Fienberg, and Holland, 1975, Goodman, 1972, or any other discussion of log-linear models for a description of the way in which "cross-product ratios" or their logarithms function as correlation coefficients for dichotomous variables.)

We find all three interactions to be significant, with school enrollment and school-year employment negatively correlated, and both school enrollment and summer employment and school-year employment and summer employment positively correlated. Thus we have clear evidence that at a fixed point in time (e.g. during the school year) school and work are net substitutes, whereas from summer to the following school year, school and work, as well as work and work, are net complements. The largest association is between work during the summer and work during the school-year, a finding consistent with the results of others. (See, for example, Clark and Summers, 1979.) The next largest association is between school enrollment and summer employment, and suggests the possibility that, other things being equal, the sample divides along a dimension defined as "participating in conventional modes of school and work." Thus, some or all of the following may hold true: (a) school enrollment aids summer employability and/or increases the desire for a summer job, (b) summer employment contributes to the desire (or the ability - monetary or otherwise) to stay enrolled in school and achieve graduation, and (c) both school enrollment and summer employment reflect a third, and heretofore unmeasured, variable, such as "ambition for success via conventional means."

The smallest of the three bivariate interactions is the negative association between school enrollment and school-year employment. That it is both negative and statistically significant supports the hypothesis that, because of time constraints if not for other reasons, school and work are net substitutes at any particular point in time. However, the small size of this correlation suggests that the Youth Entitlement demonstrations, with their goal of combining school and work, may not meet too much resistance on this score.

IV. 2 The Dynamic Specification

Tables 5-8 report the results of estimating the dynamic specification of Figure 1. The highest grade an individual has attained in school can be expected to directly affect school enrollment and job holding at future times, and can, as well, be expected to alter the effects that other explanatory variables exert upon these propensities. This is because school progress brings graduation nearer; alters the scope, nature, and time demands of schoolwork; increases the individual's desirability as a potential hire; and in these, as well as other ways, affects the costs and benefits available from job search or concentration on schooling. Furthermore, progress in school is correlated with a host of unmeasured variables (tastes for school vs. work, abilities of various sorts, parental income and other resources and background characteristics) which also affect costs and potential returns from job search and schooling. Accordingly, separate prediction equations for the dependent variables are estimated according to the highest grade the individual had attained by the close of the 1976-77 school year. For each of these calculations, the independent variables are identical to those for the reduced form, with the addition of dummy variables to indicate whether or not the youth was enrolled all year during the 1976-77 school year and whether or not the youth was employed at all during spring, 1977. The coefficients for effects of these variables on each of the dependent variables measure school/school and work/work persistence effects, as well as the school/work and work/school cross-effects as they occur over time.

Looking across these four tables at the effect of school enrollment during 1976-77 on school enrollment during 1977-78, we see that persistence in school is large indeed. For each level of grade attainment, the school/

TABLE 5

NET EFFECTS AND BIVARIATE INTERACTIONS IN MULTIVARIATE LOGIT ESTIMATION OF DETERMINANTS OF SUMMER EMPLOYMENT, SCHOOL YEAR EMPLOYMENT, AND SCHOOL ENROLLMENT. DYNAMIC SPECIFICATION. THE SAMPLE: HIGHEST GRADE ATTAINED $\leq$ 8th.

Explanatory Variable	School Enrollment Equation	School Year Employment Equation	Summer Employment Equation
Constant	0.492 (1.76)*	-0.574 (1.78)	-0.290 (0.87)
Male	0.000 (-)	0.000 (-)	0.000 (-)
Female	-0.323 (3.41)	-0.227 (1.86)	-0.410 (3.75)
White	-0.724 (6.19)	0.305 (2.10)	-0.171 (1.23)
Black	0.000 (-)	0.000 (-)	0.000 (-)
Hispanic	-0.320 (1.36)	0.145 (0.51)	-0.180 (0.66)
Denver	-0.050 (0.20)	-0.101 (0.35)	0.239 (0.87)
Phoenix	0.025 (0.12)	-0.116 (0.46)	0.312 (1.24)
Cincinnati	0.025 (0.17)	-0.540 (2.81)	0.238 (1.43)
Louisville	0.099 (0.61)	-0.228 (1.24)	0.005 (0.02)
Baltimore	0.000 (-)	0.000 (-)	0.000 (-)
Cleveland	0.582 (2.65)	-0.370 (1.69)	0.513 (2.76)
Mississippi Pilot	0.441 (2.78)	-0.597 (2.82)	-0.222 (1.16)
Mississippi Control	0.383 (2.15)	-0.789 (3.49)	0.162 (0.87)
Neither Natural Parent	-0.029 (0.17)	0.145 (0.77)	0.078 (0.43)
Natural Mother Only	-0.407 (3.46)	-0.003 (0.02)	-0.004 (0.03)
Natural Father Only	-0.313 (1.19)	-0.360 (1.02)	0.074 (0.25)
Both Natural Parents	0.000 (-)	0.000 (-)	0.000 (-)
Parents Education	0.022 (1.24)	0.009 (0.42)	-0.009 (0.44)
Not Enrolled in School, 1976-77	0.000 (-)	0.000 (-)	0.000 (-)
Enrolled in School, 1976-77	1.537 (12.47)	-0.113 (0.76)	0.205 (0.13)
Not Employed, Spring, 1977	0.000 (-)	0.000 (-)	0.000 (-)
Employed, Spring, 1977	-0.484 (2.87)	0.626 (4.67)	1.76 (10.29)
Age	-0.036 (7.58)	0.010 (2.02)	-0.004 (0.71)

Bivariate Interactions:

School Enrollment, School Year Employment:	0.054	(t=0.94)
School Enrollment, Summer Employment:	0.077	(t=1.32)
School Year Employment, Summer Employment:	0.232	(t=4.54)

Log Likelihood = -1282

* t-statistic in parentheses

TABLE 6

NET EFFECTS AND BIVARIATE INTERACTIONS IN MULTIVARIATE LOGIT ESTIMATION OF DETERMINANTS OF SUMMER EMPLOYMENT, SCHOOL YEAR EMPLOYMENT, AND SCHOOL ENROLLMENT. DYNAMIC SPECIFICATION. THE SAMPLE: HIGHEST GRADE ATTAINED = 9th.

Explanatory Variable	School Enrollment Equation	School Year Employment Equation	Summer Employment Equation
Constant	0.739 (2.46)*	-0.714 (2.80)	-0.659 (2.89)
Male	0.000 (-)	0.000 (-)	0.000 (-)
Female	0.001 (0.01)	-0.185 (2.63)	-0.225 (3.78)
White	-0.512 (4.34)	0.442 (4.81)	0.018 (0.21)
Black	0.000 (-)	0.000 (-)	0.000 (-)
Hispanic	0.069 (0.40)	0.253 (1.96)	0.157 (1.31)
Denver	-0.501 (2.93)	-0.130 (1.03)	0.305 (2.62)
Phoenix	-0.513 (2.47)	-0.048 (0.31)	0.346 (2.34)
Cincinnati	-0.059 (0.41)	-0.550 (4.96)	0.156 (1.71)
Louisville	-0.232 (1.43)	-0.325 (2.55)	-0.042 (0.38)
Baltimore	0.000 (-)	0.000 (-)	0.000 (-)
Cleveland	0.123 (0.72)	-0.803 (5.41)	0.597 (5.48)
Mississippi Pilot	0.193 (0.93)	-0.638 (4.03)	-0.502 (3.96)
Mississippi Control	0.182 (0.80)	-0.573 (3.22)	-0.044 (0.31)
Neither Natural Parent	-0.129 (0.86)	0.208 (1.70)	-0.164 (1.48)
Natural Mother Only	-0.074 (0.65)	0.143 (1.70)	-0.043 (0.60)
Natural Father Only	-0.380 (1.32)	-0.034 (0.144)	0.086 (0.42)
Both Natural Parents	0.000 (-)	0.000 (-)	0.000 (-)
Parents Education	0.042 (2.41)	0.005 (0.35)	0.009 (0.72)
Not Enrolled in School, 1976-77	0.000 (-)	0.000 (-)	0.000 (-)
Enrolled in School, 1976-77	1.408 (12.98)	0.119 (1.09)	0.357 (3.41)
Not Employed, Spring, 1977	0.000 (-)	0.000 (-)	0.000 (-)
Employed, Spring, 1977	-0.206 (1.57)	0.398 (4.25)	1.714 (12.00)
Age	-0.045 (10.43)	0.007 (2.05)	-0.002 (0.46)

Bivariate Interactions:

School Enrollment, School Year Employment:	-0.080	(t=1.94)
School Enrollment, Summer Employment:	0.006	(t=0.13)
School Year Employment, Summer Employment:	0.191	(t=5.52)

Log Likelihood = -2241

* t-statistic in parentheses

TABLE 7

NET EFFECTS AND BIVARIATE INTERACTIONS IN MULTIVARIATE LOGIT ESTIMATION OF DETERMINANTS OF SUMMER EMPLOYMENT, SCHOOL YEAR EMPLOYMENT, AND SCHOOL ENROLLMENT. DYNAMIC SPECIFICATION. THE SAMPLE: HIGHEST GRADE ATTAINED = 10th.

Explanatory Variable	School Enrollment Equation	School Year Employment Equation	Summer Employment Equation
Constant	1.341 (4.30)*	-0.283 (1.11)	-1.003 (4.68)
Male	0.000 (-)	0.000 (-)	0.000 (-)
Female	-0.065 (0.71)	-0.220 (3.15)	-0.275 (5.07)
White	-0.446 (3.45)	0.431 (4.32)	-0.008 (0.09)
Black	0.000 (-)	0.000 (-)	0.000 (-)
Hispanic	-0.634 (3.97)	0.032 (0.25)	0.196 (1.79)
Denver	-0.236 (1.36)	-0.184 (1.49)	0.187 (1.74)
Phoenix	-0.309 (1.60)	-0.119 (0.81)	0.086 (0.64)
Cincinnati	-0.263 (1.79)	-0.527 (4.70)	0.114 (1.34)
Louisville	-0.467 (2.70)	-0.504 (3.41)	-0.201 (1.79)
Baltimore	0.000 (-)	0.000 (-)	0.000 (-)
Cleveland	-0.232 (1.36)	-0.704 (4.71)	0.466 (4.35)
Mississippi Pilot	0.110 (0.55)	-0.753 (5.01)	-0.279 (2.73)
Mississippi Control	0.251 (1.00)	-0.896 (4.94)	0.221 (1.90)
Neither Natural Parent	-0.507 (3.56)	0.168 (1.44)	0.009 (0.10)
Natural Mother Only	-0.251 (2.27)	-0.021 (0.25)	0.237 (3.75)
Natural Father Only	-0.271 (1.15)	0.304 (1.65)	0.073 (0.43)
Both Natural Parents	0.000 (-)	0.000 (-)	0.000 (-)
Parents Education	0.007 (0.41)	0.011 (0.84)	0.009 (0.93)
Not Enrolled in School, 1976-77	0.000 (-)	0.000 (-)	0.000 (-)
Enrolled in School, 1976-77	1.503 (13.16)	-0.064 (0.63)	0.394 (3.89)
Not Employed, Spring, 1977	0.000 (-)	0.000 (-)	0.000 (-)
Employed, Spring, 1977	-0.136 (1.08)	0.389 (4.34)	1.417 (12.84)
Age	-0.039 (9.06)	0.006 (1.64)	0.004 (1.59)

Bivariate Interactions:

School Enrollment, School Year Employment:	-0.032	(t=0.82)
School Enrollment, Summer Employment:	0.142	(t=3.35)
School Year Employment, Summer Employment:	0.196	(t=6.16)

Log Likelihood = -2544

* t-statistic in parentheses

TABLE 8

NET EFFECTS AND BIVARIATE INTERACTIONS IN MULTIVARIATE LOGIT ESTIMATION OF DETERMINANTS OF SUMMER EMPLOYMENT, SCHOOL YEAR EMPLOYMENT, AND SCHOOL ENROLLMENT. DYNAMIC SPECIFICATION. THE SAMPLE: HIGHEST GRADE ATTAINED = 11th.

Explanatory Variable	School Enrollment Equation	School Year Employment Equation	Summer Employment Equation
Constant	0.793 (2.45)*	-0.675 (2.39)	-0.535 (2.00)
Male	0.000 (-)	0.000 (-)	0.000 (-)
Female	0.168 (2.02)	-0.115 (1.64)	-0.326 (5.02)
White	-0.119 (0.88)	0.436 (3.95)	-0.189 (1.64)
Black	0.000 (-)	0.000 (-)	0.000 (-)
Hispanic	-0.064 (0.42)	0.164 (1.27)	0.119 (0.92)
Denver	-0.627 (4.05)	-0.157 (1.28)	0.201 (1.70)
Phoenix	-0.504 (2.63)	0.013 (0.09)	0.179 (1.13)
Cincinnati	-0.413 (2.99)	-0.261 (2.38)	0.059 (0.59)
Louisville	-0.720 (4.35)	-0.272 (1.87)	-0.374 (2.69)
Baltimore	0.000 (-)	0.000 (-)	0.000 (-)
Cleveland	-0.449 (2.70)	-0.331 (2.45)	0.260 (2.17)
Mississippi Pilot	0.095 (0.55)	-0.641 (4.51)	-0.810 (6.72)
Mississippi Control	0.134 (0.62)	-0.568 (3.20)	-0.260 (1.82)
Neither Natural Parent	-0.359 (2.70)	-0.102 (0.83)	0.058 (0.51)
Natural Mother Only	-0.135 (1.34)	-0.032 (0.38)	0.161 (2.10)
Natural Father Only	0.142 (0.51)	0.100 (0.43)	0.206 (0.93)
Both Natural Parents	0.000 (-)	0.000 (-)	0.000 (-)
Parents Education	0.051 (3.23)	0.018 (1.28)	-0.003 (0.23)
Not Enrolled in School, 1976-77	0.000 (-)	0.000 (-)	0.000 (-)
Enrolled in School, 1976-77	1.586 (11.55)	-0.107 (0.89)	0.544 (3.91)
Not Employed, Spring, 1977	0.000 (-)	0.000 (-)	0.000 (-)
Employed, Spring, 1977	-0.197 (1.74)	0.467 (5.21)	1.60 (10.73)
Age	-0.032 (7.06)	0.010 (2.74)	0.001 (0.21)
Bivariate Interactions:			
School Enrollment, School Year Employment:		-0.141	(t=3.11)
School Enrollment, Summer Employment:		0.142	(t=2.79)
School Year Employment, Summer Employment:		0.195	(t=5.32)
Log Likelihood = -1882			

* t-statistic in parentheses

school effect is significant with a t-statistic of approximately 12.0, and lagged school enrollment appears to be the most powerful of all the predictors of current school enrollment. The coefficients themselves, with values around 1.5, are quite large on the logarithmic scale, and as we show below, have the effect of increasing school enrollment rates by as much as 45-64 percentage points. In addition, if one looks only at those who have completed 9th, 10th, or 11th grades, there is clear indication that the school persistence effect increases in strength as grade attainment increases. (There are several reasons to split the lowest grade attainment group from the other youth. First, they contain most of those youth with serious schooling disabilities - those lagging behind their age/grade reference group. Second, their grade attainment is heterogeneous - typically 5th through 8th grade. And finally, they show significant differences from the other groups in the impact of the independent variables. For examples, among those youth who have attained only 8 or fewer grades, females are significantly less likely than males to be currently enrolled in school. Such is not the case for the other grade attainment groups.)

With school persistence determined to be high, interest naturally centers on whether the same is true for employment persistence. Tables 5-8 show the answer to be a strong "yes." For each grade attainment group, employment during the 1976-77 school year exerts a powerful positive effect on employment during both the following summer and the following school year. In each case the effect on summer employment appears to be roughly twice that on school-year employment, and the summer effect is roughly comparable in magnitude to the school enrollment persistence effect.

Finally, we examine the cross-effects, school enrollment$_t$ employment$_{t+1}$, and employment$_t$ school enrollment$_{t+1}$. Each of these yields

interesting results. The former effect is totally absent for employment during the 1977-78 school-year. School enrollment exerts no direct effect on employment during the following school year. However, for those who have completed 9th grade or further, there is a significant positive effect of school enrollment on employment during the following summer. The absence of this effect for those who have completed fewer than 9 grades once again indicates the need to look closely at the needs and opportunities of this group. The positive effect for the other youth may be at least partly due to the practice of recruiting through the schools for summer DOL youth jobs programs.

The other cross-effect, employment_t $\text{school enrollment}_{t+1}$, is negative and significant, but not terribly large. However, it is significantly larger for the lowest grade attainment group, a result in keeping with the notion that for this group, work experience is particularly likely to decrease the desire for further schooling.

Absolute Magnitudes of Effect

Table 9 mirrors Table 4, showing fitted probabilities for the same reference population, arranged according to values of the lagged school enrollment and work experience variables. Here we see that grade attainment itself exerts a positive effect on subsequent enrollment probabilities, but an ambiguous effect on employment probabilities. (The exception to this is the positive effect exerted on summer employment for those enrolled but not employed during the 1976-77 school year.)

Most dramatically, we see that the persistence-in-school and persistence-at-work effects are extraordinarily large. For example, among those who have attained fewer than 9 grades in school, those who were neither enrolled nor employed during the 1976-77 school-year had a 20 percent

TABLE 9

FITTED SCHOOL ENROLLMENT AND EMPLOYMENT PROBABILITIES FOR THE EFFECT OF PREVIOUS GRADE ATTAINMENT, SCHOOL ENROLLMENT, AND EMPLOYMENT EXPERIENCE. REFERENCE POPULATION SAME AS TABLE 4.

9.A. Not Enrolled all Year, 1976-77; Not Employed, Spring, 1977

9.A.1 Highest Grade Attained $\leq$ 8

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO		43.3	18.9	8.5	9.3
YES		9.2	5.0	2.5	3.4

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
20.0	36.5	23.6

9.A.2 Highest Grade Attained = 9

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO		43.5	15.6	8.2	6.3
YES		16.9	4.4	3.3	1.8

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
26.4	28.2	19.6

9.A.3 Highest Grade Attained = 10

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO		27.1	20.4	3.1	5.0
YES		20.7	13.6	4.1	6.0

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
44.4	45.0	18.2

9.A.4 Highest Grade Attained = 11

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO		22.9	15.5	4.0	5.9
YES		26.5	10.2	8.2	6.9

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
51.7	38.5	24.9

TABLE 9 (cont.)

9.B. Enrolled All Year, 1976-77; Not Employed, Spring, 1977

9.B.1 Highest Grade Attained ≤ 8

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	9.1	3.2	1.8	1.6
YES	YES	41.9	18.1	11.6	12.7

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
84.3	35.6	27.8

9.B.2 Highest Grade Attained = 9

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	6.6	3.0	2.5	2.5
YES	YES	42.6	14.1	16.8	11.9

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
85.4	31.5	33.7

9.B.3 Highest Grade Attained = 10

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	2.4	1.6	0.6	0.9
YES	YES	36.7	21.3	16.1	20.5

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
94.6	44.2	38.0

9.B.4 Highest Grade Attained = 11

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978			
		NO	YES	NO	YES
NO	NO	1.2	0.7	0.6	0.8
YES	YES	33.9	10.6	31.1	21.1

Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
96.7	33.1	53.6

TABLE 9 (cont.)

9.C. Not Enrolled All Year, 1976-77; Employed, Spring, 1977

9.C.1 Highest Grade Attained ≤ 8

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978				Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
		NO		YES				
		NO	YES	NO	YES			
NO		2.6	3.9	16.9	65.2	11.4	78.5	92.9
YES		0.2	0.4	1.9	8.9			

9.C.2 Highest Grade Attained = 9

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978				Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
		NO		YES				
		NO	YES	NO	YES			
NO		4.7	3.7	27.2	46.5	17.9	59.8	89.7
YES		1.2	0.7	7.2	8.9			

9.C.3 Highest Grade Attained = 10

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978				Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
		NO		YES				
		NO	YES	NO	YES			
NO		4.8	7.8	9.1	32.8	45.5	74.0	80.7
YES		2.8	4.0	9.3	29.5			

9.C.4 Highest Grade Attained = 11

Enrolled All Year, 1977-78	Employed, Summer 1977	Employed, Fall 1977/Spring 1978				Enrolled All Year, 1977-78	Employed, 1977-78	Employed, Summer 1977
		NO		YES				
		NO	YES	NO	YES			
NO		2.3	4.0	9.9	37.4	46.4	72.3	80.1
YES		1.8	1.8	13.6	29.2			

chance of being enrolled the following year, and a 36.5 percent chance of being employed the following year. However, otherwise identical youth who were enrolled during 1976-77 had an 84.3 percent chance of being enrolled the following year. And otherwise identical youth who were employed during 1976-77 had a 78.5 percent chance of being employed the following year. Possibly, the Youth Entitlement demonstration will be able to invoke mechanisms underlying such persistence-in-state in order to create a momentum of schooling and work success for participants.

V. DISCUSSION

It has been more than fourteen years since Beverly Duncan identified the potential school disenrollment effects of youth jobs programs. In the interim, national policy ignored this issue, nor did any of the evaluations of these programs seriously attempt to measure such an effect. Now, as a result of the 1977 Youth Act, there are demonstration projects which explicitly tie school and work together. As a result, emphasis shifts from that of a jobs program to that of offering a job as an inducement to school enrollment and performance. Year-round employment is now offered, both on-the-job and in-school performance are required, and funds are available to serve all eligibles. With baseline survey data, we have sought to fit models of preprogram behavior which are appropriate to the needs of the impact evaluation to come.

Our models fit well, and the estimated effects are large and important. On a school-year to school-year basis, both school enrollment and job-holding exhibit strong persistence-in-state: school functions as a complement to school_{t+1}, employment_t as a complement to employment_{t+1}. Cross-effects are generally smaller. During the school-year itself, school enrollment and job-holding function as substitutes, but the magnitude of the negative correlation is not large.

Most of the exogenous variables show significant effects, and some of these are quite large. Particularly noteworthy are the effects of race: whites are much more likely than blacks to be employed during the school-year, and are much less likely to be enrolled in school at this time. Other effects of interest include those for females vs. males; the effects of household type and of parents education; and those of age. This latter variable is measured by single month, so that we are able to examine this

effect quite closely. (See Barclay et al, 1979, for further discussion.) Indeed, we believe that the level of detail attainable with these data goes beyond previous efforts. (For a related attempt in a different context, see the single-year-of-age calculations in Farkas, 1977.)

This paper reports results regarding the joint determination of school enrollment and job-holding in the preprogram period. Other work, currently in progress, provides sharper focus on the determinants of preprogram labor supply (see Farkas, Stromsdorfer, and Olsen, 1979). As data accumulate, we shall be reporting program effects. We do know that program enrollment rates have been quite high - in the neighborhood of 35-50 percent of eligibles across the four study sites (Farkas, Stromsdorfer, and Bottom, 1979). However, at this point we can only note that the Entitlement demonstrations appear to be well targeted on the youth population most in need, and take an innovative approach to providing jobs while discouraging school drop-out. The success of this approach is likely to depend upon youth perceptions of the attractiveness of the job offer, and the extent to which program operators are able to provide meaningful job experiences, accurate and timely monitoring of school and work performance, and believable deterrence to participant non-performance.

REFERENCES

Barclay, Suzanne, Christine Bottom, George Farkas, Ernst W. Stromsdorfer and Randall J. Olsen. 1979. Schooling and Work Among Youths From Low-Income Households; A Baseline Report from the Entitlement Demonstration. Manpower Demonstration Research Corporation.

Bishop, Y.M.M., S. Fienberg and P.W. Holland. 1975. Discrete Multivariate Analysis. Cambridge, MA.: MIT Press.

Clark, Kim B and Lawrence H. Summers. 1979. "Labor Force Participation-Timing vs. Persistence." Technical Analysis Paper No. 60. U.S. Department of Labor Office of the Assistant Secretary for Policy, Evaluation and Research.

Duncan, Beverly. 1965. "Dropouts and the Unemployed." Journal of Political Economy 73 (April): 121-34.

Farkas, George. 1977 (February). "Cohort, Age and Period Effects Upon the Employment of White Females: Evidence for 1957-1968." Demography, 14: 33-42.

Farkas, George, Ernst W. Stromsdorfer and Christine Bottom. 1979. "Public Policy to Combat Unemployment and School Dropout Among Youth from Low-Income Households." Read at the Annual Meeting of the American Sociological Association, (August), Boston, MA.

Farkas, George, Ernst W. Stromsdorfer and R.J. Olsen. 1979. "Youth Labor Supply During the Summer: Evidence for Youth from Low-Income Households." To be presented at the Econometric Society Meeting, (December), Atlanta, Georgia.

Goodman, Leo A. 1972. "A General Model for the Analysis of Surveys." American Journal of Sociology, 77: 1035-86.

Hill, Russell C. 1979. "Capacities, Opportunities and Educational Investments: The Case of the High School Dropout. The Review of Economics and Statistics, (February).

Meyer, Robert and David A. Wise. 1979. "High School Preparation and Early Labor Force Experience." National Bureau of Economic Research. Working paper. Read at the NBER Conference on Youth Unemployment, Airlie, Virginia, (May).

Nerlove, M. and S.J. Press. 1973. "Univariate and Multivariate Log-Linear and Logistic Models." Rand Corporation.

Nerlove, M. 1976. "Multivariate Log-Linear Probability Models for the Analysis of Qualitative Data." Discussion Paper, Center for Statistics and Probability, Northwestern University.